

**WHAT IS CLAIMED IS:**

1. A method for determining the noise level; as characterized by the standard deviation, of an input video sequence corrupted by unknown noise, said method comprising the steps of:

(a) spatiotemporally filtering the input video sequence, thereby producing a filtered video sequence;

(b) estimating a standard deviation from the difference between the input video sequence and the filtered video sequence, thereby producing an estimated standard deviation; and

(c) iterating through steps (a) and (b) using the estimated standard deviation previously obtained from step (b) to perform the filtering in step (a) until the value of the noise level approaches the unknown noise of the input video sequence, whereby the noise level is then characterized by a finally determined standard deviation.

2. The method of Claim 1 wherein the iterations in step (c) are carried out until the change in estimated noise level is less than a predetermined threshold.

3. The method of Claim 1 wherein the iterations in step (c) are carried out until a predetermined number of iterations has been reached.

4. The method of Claim 1 wherein step (a) employs motion estimation and compensation to establish temporal trajectories of moving points and enhance temporal correlation between points across frames.

5. The method of Claim 1 wherein the spatiotemporal filtering of step (a) reduces random noise independent of video structure.

6. The method of Claim 2 wherein a fast median estimation method is employed for efficient computation.

7. The method of Claim 1 wherein the finally determined standard deviation corresponding to the noise level is used to reduce noise in the input video sequence through spatiotemporal filtering.

8. The method of Claim 7 wherein the finally determined standard deviation corresponding to the noise level is used to evaluate video quality without using a reference video input corresponding to a ground truth value.

9. A computer storage medium having instructions stored therein for causing a computer to perform the method of claim 1.

10. System for determining the noise level, as characterized by the standard deviation, of an input video sequence corrupted by unknown noise, said system comprising:

a spatiotemporal filtering module for processing the input video sequence, thereby producing a filtered video sequence;

a noise estimation module for estimating a standard deviation from the difference between the input video sequence and the filtered video signal, thereby producing an estimated standard deviation; and

means interconnecting the filter and the noise estimation module for iterating through the modules using the estimated standard deviation previously obtained from the noise estimation module to perform the filtering in the spatiotemporal filtering module until the value of the noise level approaches the unknown noise, whereby the noise level is then characterized by a finally determined standard deviation.

11. A spatiotemporal filter for reducing noise in an input video sequence without using a reference video indicative of a ground truth value, wherein the spatiotemporal filter uses the finally determined standard deviation produced by the system of claim 10.